Proposal Reviews

#207: Primary Production in the Delta: Monitoring Design, Data Analysis and Forecasting

University of California, Davis

Initial Selection Panel Review	
Research and Restoration Technical Panel Review	
Bay Regional Review	
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Prior Performance/Next Phase Funding	
Environmental Compliance	
Budget	

Initial Selection Panel Review:

CALFED Bay-Delta 2002 ERP PSP
Initial Selection Panel Review

Proposal Number: 207

Applicant Organization: University of California, Davis

Proposal Title: Primary Production in the Delta: Monitoring Design, Data Analysis and Forecasting

Please provide an overall evaluation rating.

Explanation of Recommendation Categories: Fund

- **As Is** (a proposal recommended for funding as proposed)
- **In Part** (a proposal for which partial funding is recommended for selected project phases or components)
- **With Conditions** (a proposal for which funds are recommended if the applicant contractually agrees to meet the specified conditions)

Consider as Directed Action in Annual Workplan (a proposal addressing a high priority action that requires some revision followed by additional review prior to being recommended for funding)
Not Recommended (a proposal not currently recommended for funding-after revision may be considered in the future)

Note on "Amount":

For proposals recommended as Fund As Is, Fund In Part or Fund With Conditions, the dollar amount is the amount recommended by the Selection Panel.

For proposals recommended as Consider as Directed Action in Annual Workplan, the dollar amount is the amount requested by the applicant(s).

Fund	
As Is	**X**
In Part	**-**
With Conditions	**-**
Consider as Directed Action	**-**
Not Recommended	**-**

Amount: **$$359,201**

Conditions, if any, of approval (if there are no conditions, please put "None"):

No conditions were imposed on funding by the technical review panel or the selection panel.

Provide a brief explanation of your rating:

This proposal is of high technical quality and comes highly recommended for funding with minor or no reservation by any of the reviewers. One of the strengths of the proposal is that the work will focus on analyzing some of the historical data (plankton biomass and water quality data collected by the Interagency Ecological Program [IEP]). This proposal builds the basis for understanding, modeling and predicting ecosystem responses to changes that might affect system function. In that regard the progress and results should be invaluable to CALFED. The goal is to improve the basis for monitoring and forecasting primary productivity (PP). Since PP is driving the biological production within the system, a sound understanding of this process is essential to understanding ecosystem function at all trophic levels. The proposal's strong link to the IEP monitoring efforts (water quality project work team and other IEP teams) is another strength. The project addresses several priorities of the PSP directly or indirectly including adaptive management experiments, water movement through the Delta, and several others. This proposal has high information value to current and future CALFED efforts. This proposal is strongly supported by external and region reviews and panel evaluation. Funding is recommended, as is, given the reasonable costs, clear merits for CALFED goals and strong support by reviewers.

Research and Restoration Technical Panel Review:

CALFED Bay-Delta 2002 ERP PSP
Research and Restoration Technical Panel Review Form

Proposal Number: 207

Applicant Organization: University of California, Davis

Proposal Title: Primary Production in the Delta: Monitoring Design, Data Analysis and Forecasting

Review:

Please provide an overall evaluation summary rating:

Superior: outstanding in all respects;
Above Average: Quality proposal, medium or high regional value, and no significant administrative concerns;
Adequate: No serious deficiencies, no significant regional impediments, and no significant administrative concerns;
Not Recommended: Serious deficiencies, significant regional impediments or significant administrative concerns.

Overall Evaluation Summary Rating	Provide a brief explanation of your summary rating
XSuperior	**Jassby has submitted an excellent proposal that builds upon his previous exceptional research on the Delta's hydrology, chemistry, phytoplankton biology, and ecosystem services. Jassby addresses important Delta wide problems, maximizes/optimizes use of under-utilized long-term data sets, and provides a framework to be used in the adaptive management of Delta restoration projects. The proposed work has the potential to generate a powerful forecasting tool for Delta managers, and may provide the model used in other estuarine restoration projects. The review panel highly recommends full funding of this proposal.**
-Above average	
-Adequate	
-Not recommended	

1. **Goals and Justification.** Does the proposal present a clear statement of goals, objectives and hypotheses? Does the proposal present a clear justification and conceptual model for the project?

   Jassby proposes three broad goals associated with the assessment and forecasting of phytoplankton net primary production throughout the Delta and northern San Francisco Bay: 1) optimization of an existing Delta-wide monitoring program, 2) quantification of the causal mechanisms responsible for spatial and inter-annual variability, and 3) forecast future change in response to planned restoration action or unplanned environmental change. Jassby outlines a series of specific, critical questions that must be addressed in a step-wise fashion to achieve success. The concept is definitely timely and important for the following reasons: 1) the Delta's food web is thought to be tightly coupled to phytoplankton production, 2) Delta-wide phytoplankton has declined over the past two decades in many regions of the Delta and northern bay, 3) sub-regions within the southern Delta have experienced large annual blooms that have resulted in severe oxygen draw-down, 4)

drinking water quality is a partial function of the amount and types of phytoplankton that are present, and 5) Delta restoration actions will likely alter sub regional and potentially regional conditions that influence net primary production.

The work is cetainly justified given the concerns raised above. More importantly, Jassby has made remarkable use of the existing IEP data sets and has turned a vast amount of raw data into authoritative, scholarly publications that provide a major component of our existing knowledge of the Delta.

2. **Likelihood of Success (Approach, Feasibility, Capabilities and Performance Measures).** Is the project likely to succeed based on the approach, feasibility and project team capabilities? Are the proposed performance measures adequate for measuring the project's success?

   Jassby's quantitative and statistical skills are of the highest rank, and he is an authority on ecological time-series data and analysis of complex multivariate data sets. More importantly, he has an impeccable publication record in terms of similar SF-Bay-Estuary-Delta problems. Likelihood for success on the general objectives #1 and #2 is extremely high. Forecasting is a frontier area in the environmental sciences and Jassby recognizes that accurate forecasting of primary production is a major challenge. Jassby provides a thorough explanation of the major hurdles that he anticipates encountering as he builds a predictive model.

   CAPABILITIES: Outstanding. CALFED could not recruit a scientist more capable of solving the problems at hand.

3. **Outcomes and Products.** Will the project advance the state of scientific knowledge in general and/or make an important contribution to the state of knowledge of the Bay-Delta Watershed? For restoration proposals, is the project likely to contribute to ecosystem restoration or species recoveries in a significant way? Will the project produce products useful to decision-makers and scientists?

   Jassby has organized the work around three stages and proposes a product after each stage.

   Yes. Authoritative publications are certain. In terms of CALFED restoration projects, the completion of objectives #1 and #2 will provide the Delta-wide skeleton for designing restoration strategies and, more importantly, for detecting and quantifying their impact. These interpretive outcomes are critical for successful adaptive management.

   All the external reviewers rated the proposal as excellent. Integration of previous modeling efforts that addressed Delta organic matter dynamics would increase the range of potential products, especially if future restoration actions increase the percentage of Delta wetlands.

4. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

   Very reasonable, and a real bargain if even limited predictive capabilities emerge from this work

5. **Regional Review.** How did the regional panel(s) rank the proposal (High, Medium, Low)? Did the regional panel(s) identify significant benefits (regional priorities, linkages with other activities, local involvement) or impediments (local constraints, conflicts with other activities, lack of local involvement) to this proposal? What were they?

HIGH-MED---- some concerns with forecasting

6. **<u>Administrative Review.</u>** Were there significant concerns about the proposal with regard to the prior performance, environmental compliance and budget administrative reviews? What were they?

   OK

Miscellaneous comments:

None

Bay Regional Review:

Proposal Number: 207

Applicant Organization: University of California, Davis

Proposal Title: Primary Production in the Delta: Monitoring Design, Data Analysis and Forecasting

Overall Ranking: **-**Low **-**Medium **X**High

Provide a brief summary explanation of the committee's ranking:

The panel rated this research high because it is generally fills a critical research gap in our understanding of primary production (PPR) in the Suisun Bay and Delta. It is believed that this research will assist DWR in their ability to redesign their the ongoing monitoring of PPR and improve our understanding and ability to forecast PPR in the Suisun. The proposal was well written and appeared very feasible using existing data sources.

1. Is the project feasible based on local constraints?

   XYes **-**No

   How?

   Yes, the research proposed uses existing data sources and research techniques which are well documented.

2. Does the project pursue the restoration priorities applicable to the region as outlined in the PSP?

   XYes **-**No

   How?

   Yes, understanding past trends in PPR and the factors that are potentially linked to PPR will aid us in our understanding of current PPR trends in the Suisun Bay/Delta and the possible impacts of restoration projects. Specifically stated in the proposal: This proposal addresses several ERP strategic goals, but the most direct linkage is with Strategic Goal 2: Ecosystem Processes and Biotic Communities - Natural flow regimes and Decline in productivity. Previous work showed that phytoplankton support the food web on a Delta-wide scale and this proposal seeks to understand and forecast how long-term trends, restoration alternatives and climate change will affect this productivity. A second important linkage is with Strategic Goal 6: Water and Sediment Quality - dissolved oxygen and oxygen-depleting substances. Also MR 1-MR-6.

3. Is the project adequately linked with other restoration activities in the region, such as ongoing implementation projects and regional planning efforts?

   XYes **-**No

How?

The proposal does not explicitly identify the programs aimed at restoration but does indicate direct connections to ongoing monitoring programs (DWR/EMP).

4. Does the project adequately involve local people and institutions?

XYes **-**No

How?

Yes, the P.I. has strong local ties to local research and a long track record on integrated work. One of the participants works at DWR and is very involved in evaluating aspects of the Env. Monitoring Program (EWP, connected to IEP). Other comments: This is an important study however, I would like to see it better tied to the spatial data gathering on chlorophyll to ensure that overall calculations of chlorophyll a and production are based on consistent methodologies.

Other Comments:

The P.I. is well qualified and has performed similar research in the past with significant results.

Delta Regional Review:

Proposal Number: 207

Proposal Title: Primary Production in the Delta: Monitoring Design, Data Analysis and Forecasting

Overall Ranking: **-**Low **X**Medium **-**High

Provide a brief summary explanation of the committee's ranking:

This is a useful project, but isn't essential now.

1. Is the project feasible based on local constraints?

   XYes **-**No

   How?

   Well grounded in work to date; Incorporates date gathered to date; Conceptual model is supportable by existing system rationale. Some constraints may be insufficient availability of historic data of necessary quality and scale. General uncertain nature of forecasting is in itself a constraint.

2. Does the project pursue the restoration priorities applicable to the region as outlined in the PSP?

   -Yes **X**No

   How?

   There is no specific restoration priority listed for this project. It proposes to generate information that will be useful toward improving our understanding phytoplankton primary productivity variability through developing a reliable monitoring program and subsequently develop and forecasting ability for phytoplankton production. This is a basic component of any ecosystem and its mechanisms specific to the Bay Delta system needs to be understood.

3. Is the project adequately linked with other restoration activities in the region, such as ongoing implementation projects and regional planning efforts?

   XYes **-**No

   How?

   Portions of work is based on existing data. Data analysis will be done through IEP. Communication linkage through IEP newsletter

4. Does the project adequately involve local people and institutions?

   XYes **-**No

How?

Close past linkage through IEP technical personnel and communication network. However, the linkage to other closely related projects needs to be strengthen. This work should be joined through conceptual models and linked rationale with work in such areas as TOC, benthic studies, contaminants, nutrients and hydrodynamics.

Other Comments:

X

External Scientific: #1

Research and Restoration External Scientific Review Form

Proposal Number: **207**

Applicant Organization: **University of California, Davis**

Proposal Title: **Primary Production in the Delta: Monitoring Design, Data Analysis and Forecasting**

Conflict of Interest Statements:
I have no financial interest in this proposal.
XCorrect
-Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

None

Review:

Please provide an overall evaluation summary rating:

Excellent: outstanding in all respects;
Good: quality but some deficiencies;
Poor: serious deficiencies.

Overall Evaluation Summary Rating	**Provide a brief explanation of your summary rating**
XExcellent	**I give this proposal an excellent rating due to the high marks on all the above review qualifications. I highly recommend it for funding.**
-Good	
-Poor	

1. **Goals.** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?

   The goals are 1) to provide technical and conceptual support to help in redesigning the EMP, 2) to extend the data analysis to the subregional and station-specific scale, and 3) to develop stochastic time series models for forecasting phytoplankton productivity.

2. **Justification.** Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

This is a well justified proposal as it addresses topics directly germane to CALFED restoration activities. The topic of phytoplankton primary production is at the heart of ecosystem function and as such is of great interest to CALFED restoration efforts.

3. **Approach.** Is the approach well designed and appropriate for meeting the objectives of the project? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology or approaches? Will the information ultimately be useful to decision-makers?

   The scientific approach is efficiently designed and organized into specific tasks. This is a statistically intensive, data mining approach to the development of a more accurate and usable monitoring program as well as a predictive modeling effort in its own right.

4. **Feasibility.** Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives?

   I believe the feasibility of performing the work is very high, given the research history and experience of the PI. The specific tasks are well discussed and probabilities of success well documented by past work. The author is refreshingly upfront about the uncertainty of accomplishing the third goal of forecasting. I do not have a problem with this, in fact one of the strengths of this proposal is the clear-sighted view of the process by which forecast modeling will be conducted.

5. **Project-Specific Performance Measures.** Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Is there enough detail as to how the performance measures will be quantified? For restoration projects, are monitoring plans explicit and detailed enough to determine if performance measures will be adequately assessed?

   Performance measures should be better defined. Saying only that this is research and will be reported in the literature is not enough. However, none of the other scientific proposals I read had much to say about this topic. I would expect a significant performance measure to be the accuracy of forecasts to actual events.

6. **Products.** Are products of value likely from the project? Specifically for restoration projects, are products of value also likely from the monitoring component? Are interpretative outcomes likely from the project?

   To echo the above: products should be better defined. Saying only that this is research and will be reported in the literature is not enough. I expected to see some sort of model outputs of phytoplankton productivity under different restoration scenarios.

7. **Capabilities.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

   The PI is highly qualified in this field of research and has vast experience in phytoplankton ecology. In addition he is well plugged inot the whole EMP process and savvy to CALFED restoration activities.

8. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

The budget is reasonable and adequate for the project.

Miscellaneous comments:

None

External Scientific: #2

Research and Restoration External Scientific Review Form

Proposal Number: **207**

Applicant Organization: **University of California, Davis**

Proposal Title: **Primary Production in the Delta: Monitoring Design, Data Analysis and Forecasting**

Conflict of Interest Statements:
I have no financial interest in this proposal.
XCorrect
-Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

None, other than familiarity with Dr Jassby's work on the Bay-Delta

Review:

Please provide an overall evaluation summary rating:

Excellent: outstanding in all respects;
Good: quality but some deficiencies;
Poor: serious deficiencies.

Overall Evaluation Summary Rating	**Provide a brief explanation of your summary rating**
XExcellent	**On target for CalFed needs, budget appropriate, credentials impeccable, high priority for directing other CalFed activities. Do this, and do this first.**
-Good	
-Poor	

1. **Goals.** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?

   Review of Jassby, "Primary production in the Delta: Monitoring design, data analysis and forecasting," submitted to CalFed.

   The proposed work plan consists of 3 tasks, as indicated by its title. The tasks are well-integrated in the proposal and flow in a logical sequence (which is not quite true for the title). Dr. Jassby would continue statistical analysis of the IEP data base with the goal of revising the IEP monitoring program so that it 1) yields maximum knowledge about the state of the Delta ecosystem for the lowest effort; 2) has the flexibility to be responsive to changes in the underlying physicochemical structure of the Delta ecosystem that may result from implementation of remediation measures; and 3) by successfully accomplishing 1 and

2, provides data for use in adaptive management of the evolving Delta ecosystem. He would also use the data and insights gained from its analysis to develop a predictive model for phytoplankton primary production in the Delta.

The proposed work plan has been carefully thought-out and integrated. Dr. Jassby is familiar with the extent and limitations of the existing data set; he made this clear in discussions at various places in the proposal. His number crunching and modeling capabilities are legend.

Extending the analyses to TOC/N surrogates (total Kjeldahl nitrogen and volatile suspended solids) is a plus, though volatile suspended solids is actually POC, not TOC and POC is usually a small fraction of TOC, not necessarily well-correlated with TOC, and thus may not shed much light on factors controlling DOC distributions, which are the real problem with taste and odor. However, as Jassby indicates, this is an ancillary objective that can be accomplished with little additional effort and that might shed light on other facets of Delta function.

A comment, not a criticism of the proposed scope of work: the proposal is fairly narrowly focused on phytoplankton, which is fine under the current configuration of the Delta, as Jassby and co-workers have made a convincing case that phytoplankton are currently the dominant source of "food" for the Delta foodweb). However, a concern is that reconfiguration of the Delta to create more shallow water habitat may result in increased trophic importance of macrophytes of one sort or another. Note that Nixon's figure presented in Figure 1 to support the point that phytoplankton=higher trophic levels does not discriminate between phytoplankton and macrophyte production. Production of higher trophic levels does not have to proceed via a planktonic intermediate; understanding food quality of POC for zooplankton only tells you about food quality of POC for zooplankton, not about other possible modes of trophic transfer (see Kneib's recent review). Jassby's discussion in the modeling section of the proposal deals with changes in physicochemical variables that affect phytoplankton, but not with possible changes in the kind of dominant primary producer. Worrying about this is kind outside the scope of the proposal and may not directly impact on the phytoplankton model, as the proposed models are not really linked to production of higher trophic levels. But it is something for managers to keep in mind if they choose to use the models resulting from this work for forecasting possible changes in the production of higher trophic levels that might result from one or another restoration scenario.

Finally, I was a little surprised that existing phytoplankton models for the Delta were not discussed, if for no other reason than to demonstrate why Dr. Jassby's models would be superior. The IEP has spent considerable sums building phytoplankton models for the Delta over the years, starting (and perhaps ending?) with the Hydroqual model. None of this was discussed in the proposal, which focused rather narrowly on Dr. Jassby's work with USGS scientists.

The proposed budget is quite reasonable. Dr. Jassby provides an invaluable service to the IEP by working with the existing data set - the kinds of analyses proposed here are what set the IEP apart from other large ecosystem monitoring programs where data goes into a black hole because those involved in collecting it do not have the time or training to examine it. In this regard, Jassby's continued collaboration with agency scientist Mueller-Solger is a distinct plus. The proposed studies are a good investment of CalFed funds, they will continue to yield benefits long after the end of the study. I rate the proposal as EXCELLENT and strongly urge its funding.

2. **Justification.** Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

See 1. The proposed study is well justified by the needs of the CalFed program, proposed studies carefully focused on CalFed needs

3. **Approach.** Is the approach well designed and appropriate for meeting the objectives of the project? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology or approaches? Will the information ultimately be useful to decision-makers?

   See 1. Approach well designed and the various aspects of the proposed study are well integrated. The study is very much applied to CalFed needs and will add to overall studning of the Delta, but they are also very site-specific and thus, other than in very general terms (i.e. application of the general approach) won't apply much beyond the study area - wich is fine for CalFed.

4. **Feasibility.** Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives?

   See 1. Yes, eminently feasible nd Jassby has the credentials to do an excellent job.

5. **Project-Specific Performance Measures.** Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Is there enough detail as to how the performance measures will be quantified? For restoration projects, are monitoring plans explicit and detailed enough to determine if performance measures will be adequately assessed?

   See 1. Yes, though the projects will be intellectual property and thus somewhat harder to evaluate than a fish screen or pond.

6. **Products.** Are products of value likely from the project? Specifically for restoration projects, are products of value also likely from the monitoring component? Are interpretative outcomes likely from the project?

   See 1. Yes, most definitely. Both from helping optimize CalFed monitoring to developing a product that should be integral to design and adaptive management

7. **Capabilities.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

   See 1. I can't think of anyone who would do a better job with this. Dr Jassby's credentials are impeccable. He has an excellent track record for performance on past IEP and CalFed contracts and grants, as well as on less applied projects funded by NSF and other agencies.

8. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

   See 1. Budget quite reasonable. Benefits will persist long beyond the termination date of the contract, potential pay-back in funds saved through monitoring as well as appropriate design and evaluation of proposed of restoration actions should more than pay for the cost of the work.

Miscellaneous comments:

See 1.

External Scientific: #3

Research and Restoration External Scientific Review Form

Proposal Number: **207**

Applicant Organization: **University of California, Davis**

Proposal Title: **Primary Production in the Delta: Monitoring Design, Data Analysis and Forecasting**

Conflict of Interest Statements:
I have no financial interest in this proposal.
XCorrect
-Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

I have known Alan Jassby as a fellow scientist studying aquatic ecology for several years. We have never formally collaborated.

Review:

Please provide an overall evaluation summary rating:

Excellent: outstanding in all respects;
Good: quality but some deficiencies;
Poor: serious deficiencies.

Overall Evaluation Summary Rating	**Provide a brief explanation of your summary rating**
XExcellent	**Jassby is an excellent scientist who has proposed study of a key ecological process with modern methods that should significantly improve and monitoring and management of the Delta.**
-Good	
-Poor	

1. **Goals.** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?

   Jassby has identified primary productivtiy as a key process in the Delta and has done a masterful job of describing a complex set of techniques for analyzing time series data, and using the results of these analyses to guide monitoring activities, to understand processes causes changes in primary productivity and in developing forecasting models. His objectives are clear and tractable, and the role of primary productivity in the Delta ecosystem is certainly critical to its health and functioning.

2. **Justification.** Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

   Although much work has been conducted, in general, and specifically in the Delta, on primary productivity and its ecological regulation, Jassby proposes new and innovative approaches that should lead to significantly improved understanding and management of the Delta ecosystem.

3. **Approach.** Is the approach well designed and appropriate for meeting the objectives of the project? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology or approaches? Will the information ultimately be useful to decision-makers?

   Jassby will employ established and sophisticated statistical techniques to a complex dataset, and, in doing so, should be able to decipher patterns not apparent to simpler approaches. Although he will not generate new data, he will significantly increase understanding of existing or future data.

4. **Feasibility.** Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives?

   The methods are well documented and, in Jassby's hands, technically feasible. He is very likely to generate patterns and models that will prove useful.

5. **Project-Specific Performance Measures.** Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Is there enough detail as to how the performance measures will be quantified? For restoration projects, are monitoring plans explicit and detailed enough to determine if performance measures will be adequately assessed?

   While admitting that some of the statistical approaches are exploratory, Jassby provides sufficient criteria on which to judge the veracity of the results to be confident that he can judge the success of the approaches. The results are inherently quantitative.

6. **Products.** Are products of value likely from the project? Specifically for restoration projects, are products of value also likely from the monitoring component? Are interpretative outcomes likely from the project?

   The forecasting models expected should be of value to guide monitoring and management decisions.

7. **Capabilities.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

   Jassby has a stellor record completing similar projects. Moreover, he has a well established working relationship with the scientists who have collected much of the data.

8. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

The budget is quite reasonable for the tasks proposed.

Miscellaneous comments:

External Scientific: #4

Research and Restoration External Scientific Review Form

Proposal Number: **207**

Applicant Organization: **University of California, Davis**

Proposal Title: **Primary Production in the Delta: Monitoring Design, Data Analysis and Forecasting**

Conflict of Interest Statements:
I have no financial interest in this proposal.
XCorrect
-Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

none

Review:

Please provide an overall evaluation summary rating:

<u>Excellent:</u> outstanding in all respects;
<u>Good:</u> quality but some deficiencies;
<u>Poor:</u> serious deficiencies.

Overall Evaluation Summary Rating	**Provide a brief explanation of your summary rating**
XExcellent	**The proposed research is on an important component of the food web, the investigator has an excellent track record, the research utilizes an extensive historical record, the analytical techniques are appropriately sophisticated, and the research products will be of value to managers in both monitoring and restoring the Bay/Delta.**
-Good	
-Poor	

1. **<u>Goals.</u>** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?

   The goal of this project is the measurement, analysis and prediction of phytoplankton production in the Delta and Suisun Bay. The focus is on refining the existing monitoring program, on assessing processes responsible for interannual variability in phytoplankton productivity, and in developing forecasting models. These goals are clearly stated. The concept is timely (because the state is evaluating its monitoring procedures) and important (because phytoplankton are the base of the food web in the Bay and appear to be an important route for Se to get into the food web).

2. **Justification.** Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

   The study builds on existing knowledge and takes advantage of an existing long-term data set. The conceptual model is clearly articulated. The only thing I question is how important phytoplankton exudates are as a source of DOC that results in problems with disinfection byproducts. Other proposals I have read suggest watershed sources are more significant.

3. **Approach.** Is the approach well designed and appropriate for meeting the objectives of the project? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology or approaches? Will the information ultimately be useful to decision-makers?

   Sophisticated analytical techniques are proposed to analyze existing data. The approach will allow an extension of the analysis to subregional scales; the approach has already proven successful at the scale of the Delta as a whole. The approach builds on existing understanding, analytical expertise, and an impressive historical record.

4. **Feasibility.** Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives?

   Jassby's candid assessment of the feasibility of different components of the project was a most refreshing and welcome aspect of this proposal. He anticipates the greatest difficulty in the forecasting aspects of the proposed work, and I agree. However, I have to note that if anyone is likely to succeed with this, he is.

5. **Project-Specific Performance Measures.** Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Is there enough detail as to how the performance measures will be quantified? For restoration projects, are monitoring plans explicit and detailed enough to determine if performance measures will be adequately assessed?

   All of this is adequate.

6. **Products.** Are products of value likely from the project? Specifically for restoration projects, are products of value also likely from the monitoring component? Are interpretative outcomes likely from the project?

   The input into design of an improved monitoring program seems extremely valuable as does the analysis of processes leading to phytoplankton productivity at the subregional scale and the development of the stochastic time series models. Because of the importance of phytoplankton in the food web, these are valuable products. There appears to be good collaboration with DWR scientists, which increases the value and applicability of the research products.

7. **Capabilities.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

   The researcher has an impressive publication record, has obvious expertise in the ecosystem and in the analytical methods being proposed. The proposal was very well written and explained complex concepts and approaches very clearly.

8. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

   Seems reasonable.

Miscellaneous comments:

External Scientific: #5

Research and Restoration External Scientific Review Form

Proposal Number: **207**

Applicant Organization: **University of California, Davis**

Proposal Title: **Primary Production in the Delta: Monitoring Design, Data Analysis and Forecasting**

Conflict of Interest Statements:
I have no financial interest in this proposal.
XCorrect
-Incorrect

In the blank below please explain any connection to proposal, to applicant, co-applicant or subcontractor or to submitting institution (write "none" if no connection):

Alan Jassby is a co-author on a manuscript that I recently submitted. My manuscript made use of his deta-wide oraganic matter mass balance (Jassby and Cloern 2000)and thus his authorship was warranted. Jassby has collaborated with my supervisor, James Cloern, on several publications. I have no financial interest in the proposal, and Jassby's work is outstanding and has provided the basis for several thrusts of the CALFED Science Program.

Review:

Please provide an overall evaluation summary rating:

Excellent: outstanding in all respects;
Good: quality but some deficiencies;
Poor: serious deficiencies.

Overall Evaluation Summary Rating	**Provide a brief explanation of your summary rating**
XExcellent	**Jassby has submitted an excellent proposal that builds upon his previous exceptional research on the Delta's hydrology, chemistry, phytoplankton biology, and ecosystem services. Jassby addresses important Delta wide problems, maximizes/optimizes use of under-utilized long-term data sets, and provides a framework to be used in the adaptive management of Delta restoration projects. The proposed work has the potential to generate a powerful forecasting tool for Delta managers, and may provide the model used in other estuarine restoration projects. I highly recommend full funding of this proposal.**
-Good	
-Poor	

1. **Goals.** Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the concept timely and important?

Jassby proposes three broad goals associated with the assessment and forecasting of phytoplankton net primary production throughout the Delta and northern San Francisco Bay: 1) optimization of an existing Delta-wide monitoring program, 2) quantification of the causal mechanisms responsible for spatial and inter-annual variability, and 3) forecast future change in response to planned restoration action or unplanned environmental change. Jassby outlines a series of specific, critical questions that must be addressed in a step-wise fashion to achieve success. The concept is definitely timely and important for the following reasons: 1) the Delta's food web is thought to be tightly coupled to phytoplankton production, 2) Delta-wide phytoplankton has declined over the the past two decades in many regions of the Delta and northern bay, 3) sub-regions within the southern Delta have experienced large annual blooms that have resulted in severe oxygen draw-down, 4) drinking water quality is a partial function of the amount and types of phytoplankton that are present, and 5) Delta restoration actions will likely alter subregional and potentially regional conditions that influence net primary production.

2. **Justification.** Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

   The work is certainly justified given the concerns raised above. More importantly, Jassby has made remarkable use of the existing IEP data sets and has turned a vast amount of raw data into authoritative, scholarly publications that provide a major component of our existing knowledge of the Delta.

3. **Approach.** Is the approach well designed and appropriate for meeting the objectives of the project? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology or approaches? Will the information ultimately be useful to decision-makers?

   The approach is well designed and the results are certain to add to the base of our knowledge. Jassby has a long history of producing novel information and approaches. More germane to the CALFED Science Program, Jassby has a long history of producing authoritaive AND accessible information to decision makers.

4. **Feasibility.** Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives?

   Jassby's quantitative and statistical skills are of the highest rank, and he is an authority on ecological time-series data and analysis of complex mutivariate data sets. More importantly, he has an impeccable publication record in terms of similar SF-Bay-Estuary-Delta problems. Likelihood for success on the general objectives #1 and #2 is extremely high. Forecasting is a frontier area in the environmental sciences and Jassby recognizes that accurate forecasting of primary production is a major challenge. Jassby provides a thorough explaination of the major hurdles that he anticipates encountering as he builds a predictive model.

5. **Project-Specific Performance Measures.** Does the project include appropriate performance measures to measure success relative to the project's goals and objectives? Is there enough detail as to how the performance measures will be quantified? For restoration projects, are monitoring plans explicit and detailed enough to determine if performance measures will be adequately assessed?

YES-YES-YES Jassby has organized the work around three stages and proposes a product after each stage.

6. **Products.** Are products of value likely from the project? Specifically for restoration projects, are products of value also likely from the monitoring component? Are interpretative outcomes likely from the project?

   Yes. Authoritative publications are certain. In terms of CALFED restoration projects, the completion of objectives #1 and #2 will provide the Delta-wide skeleton for designing retoration strategies and, more importantly, for detecting and quantifying their impact. These interpretive outcomes are critical for successful adaptive management.

7. **Capabilities.** What is the track record of applicants in terms of past projects? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

   Outstanding. CALFED could not recruit a scientist more capable of solving the problems at hand.

8. **Cost/Benefit Comments.** Is the budget reasonable and adequate for the work proposed?

   very reseasonable, and a real bargain if even limited predictive capabilities emerge from this work

Miscellaneous comments:

Jassby has only requested 1 month of RA support and 3 months of graduate RA support a year. More sustained support for either a highly qualified research assistant or student may be more efficient and would free Jassby from some of the data mining and organization.

Prior Performance/Next Phase Funding:

New Proposal Number: 207

New Proposal Title: Primary Production in the Delta: Monitoring Design, Data Analysis and Forecasting

1. Prior CALFED project numbers, titles, and programs: (*list only projects for which you are the contract manager*)

   NOTE the Prior/Ongoing CALFED Project Title and Number do not match on the faxed list and the beginning and end of the title is missing -- you have listed ....matter in the habitat and its relationship to the food chain....as 97-B06?? Following are the three agreements with correct Title and Number and Project Manager that I have administered with USGS:

   CALFED #97-B02, USBR #98-AA-20-16230 - U.S. Geological Survey - Sedimentation Movement, Availability and Monitoring in the Delta - David Schoellhamer

   CALFED #97-B06, USBR #98-AA-20-16240 - U.S. Geological Survey - Assessment of the Sacramento-San Joaquin River Delta as Habitat for Production of the Food Resources that Support Fish Recruitment - William Sobczak

   CALFED #98-B07, USBR #98-AA-20-16950 - U.S. Geological Survey - Assessment of the Impacts of Selenium on Restoration of the San Francisco Bay-Delta Ecosystem - Sam Luoma

2. Prior CVPIA project numbers, titles, and programs: (*list only projects for which you are the contract manager*)

   N/A

3. Have negotiations about contracts or contact amendments with this applicant proceeded smoothly, without persistent difficulties related to standard contract terms and conditions?

   -Yes **-**No **X**N/A

   If no, please explain any difficulties:

4. Are the status, progress, and accomplishments of the applicant's current CALFED or CVPIA project(s) accurately stated?

   -Yes **-**No **X**N/A

   If no, please explain any inaccuracies:

5. Is the applicant's progress towards these project(s)' milestones and outcomes to date satisfactory?

   -Yes **-**No **X**N/A

   If no, please explain deficiencies:

6. Is the applicant's reporting, records keeping, and financial management of these projects satisfactory?

   -Yes -No **X**N/A

   If no, please explain deficiencies:

7. Will the project(s) be ready for next phase funding in 2002, based on its current progress and expenditure rates?

   -Yes -No **X**N/A

   If no, please explain:

Other Comments:

No personal knowledge of performance of UC Davis who is applicant for this proposal.

Environmental Compliance:

Proposal Number: 207

Applicant Organization: University of California, Davis

Proposal Title: Primary Production in the Delta: Monitoring Design, Data Analysis and Forecasting

1. Are the legal or regulatory issues that affect the proposal identified adequately in the proposal?

   XYes **-**No

   If no, please explain:

2. Does the project's timeline and budget reflect adequate planning to address legal and regulatory issues that affect the proposal?

   XYes **-**No

   If no, please explain:

3. Do the legal and regulatory issues that affect the proposal significantly impair the project's feasibility?

   -Yes **X**No

   If yes, please explain:

Other Comments:

Budget:

Proposal Number: 207

Applicant Organization: University of California, Davis

Proposal Title: Primary Production in the Delta: Monitoring Design, Data Analysis and Forecasting

1. Does the proposal include a detailed budget for each year of requested support?

   XYes **-**No

   If no, please explain:

2. Does the proposal include a detailed budget for each task identified?

   XYes **-**No

   If no, please explain:

3. Does the proposal clearly state the type of expenses encompassed in indirect rates or overhead costs?

   XYes **-**No

   If no, please explain:

4. Are appropriate project management costs clearly identified?

   -Yes **X**No

   If no, please explain:

   Budget justification does not explain project management.

5. Do the total funds requested (Form I, Question 17A) equal the combined total annual costs in the budget summary?

   XYes **-**No

   If no, please explain (for example, are costs to be reimbursed by cost share funds included in the budget summary).

6. Does the budget justification adequately explain major expenses?

   XYes **-**No

If no, please explain:

7. Are there other budget issues that warrant consideration?

   -Yes **X**No

   If yes, please explain:

Other Comments: